

Historic, Archive Document

Do not assume content reflects current
scientific knowledge, policies, or practices.

H49,9
R31H
cop. 2

Dairy Herd Improvement Letter

JANUARY - FEBRUARY 1972

Vol. 48, No. 1

ARS 44-239

NATIONAL COOPERATIVE
DAIRY HERD IMPROVEMENT
PROGRAM

A dairy recordkeeping plan
for every herd

U.S. DEPT. OF AGRICULTURE
NATIONAL COOPERATIVE
DAIRY HERD IMPROVEMENT
PROGRAM

AFR 13 '77

ANIMAL SCIENCE
RESEARCH DIVISION

CONTENTS

	Page
State lactation averages by breed for Official DHI cows calving in 1969-----	1
Reducing records to a twice-a-day-milking basis-	3
Formic acid approved as additive to forage at ensiling-----	9
Subject index--1971 Dairy Herd Improvement Letters, Vol. 47-----	10
Title index--1971 Dairy Herd Improvement Letters, Vol. 47-----	11

Issued April 1972

Dairy Herd Improvement Letter
January-February 1972

STATE AND NATIONAL LACTATION AVERAGES BY BREED FOR OFFICIAL
DHI COWS CALVING IN 1969 1/

This publication contains lactation averages for milk yield (lb.), fat percentage, and fat yield (lb.) by breed for cows calving in 1969 in each of the 50 States, and for the United States as a whole. Lactation averages have been standardized to a twice-a-day milking (2X), 305-day lactation length, mature equivalent (M.E.) basis.

Records included in averages.--Only Official DHI records 2/ which passed USDA editing procedures described in the December 1970 Dairy Herd Improvement Letter, ARS 44-222, were included in the averages. Cows were not included if the breed of sire and breed of dam were different. Records of cows with unknown sires or dams were included in averages for the cow's breed. For instance, a cow reported as a Brown Swiss (breed 5) would not have been included if her dam was coded as another breed. However, if the cow's sire or dam has been reported as breed 0, unknown, the cow would have been included in the averages for Brown Swiss cows.

How records were standardized to a 2X, 305-day, M.E. basis.--Lactations where cows were denied an opportunity to milk 305 days were projected to a 305-day basis with factors that account for differences in lactation curves by breed, age, and the two yield traits--milk and fat. These factors are currently used by USDA and were published in the August 1965 Dairy Herd Improvement Letter, ARS 44-164.

All lactations were adjusted to a mature equivalent (M.E.) basis by the age adjustment factors currently in use

- - - - -

1/ Prepared by B. T. McDaniel, G. J. King, and F. N. Dickinson with the technical assistance of A. H. Kienast, L. G. Waite, C. J. Weber, V. H. Lytton, and J. J. Corbin.

2/ DHIR records are included since they are also Official DHI records.

by USDA. These account for variation due to breed, season, region, and the two yield traits--milk and fat. The factors used were published in the February 1967 Dairy Herd Improvement Letter, ARS 44-188.

Lactations made on three- or four-times-a-day milking were reduced to a twice-a-day (2X) basis with factors published in ARS 52-1 and included on page 3 of this Letter. 3/

Fat percentages were computed from the 2X, 305-day, M.E. milk and fat yields, which put them on the same basis.

The number of Official DHI and DHIR lactation records available for each breed for the United States and their respective 2X, 305-day, M.E. averages for milk and fat yields for cows calving in 1969 are as follows:

Breed	Records	Milk	Fat	Fat
	<u>No.</u>	<u>Lb.</u>	<u>%</u>	<u>Lb.</u>
Ayrshire	23,555	11,415	3.89	444
Guernsey	104,076	9,939	4.62	459
Holstein	1,405,949	14,277	3.61	515
Jersey	103,032	9,142	4.99	456
Brown Swiss	27,151	12,419	4.02	499
M. Shorthorn	3,031	10,210	3.70	378

Tables of State averages and numbers of records by breed and year.--The number of Official DHI lactation records available in each State and respective 2X, 305-day, M. E. averages for lactation milk yields, fat percentages, and fat yields are presented in separate tables for each breed.

3/ Kendrick, J. F. Standardizing Dairy Herd Improvement Association Records in Proving Sires. U.S. Dept. of Agr., Agr. Res. Serv. ARS 52-1. 1955.

Averages for Ayrshire cows calving in different States are in table 1. For example, table 1 shows that the 124 Ayrshire cows calving in Alabama in 1969 averaged 10,777 pounds of milk, 3.58 percent fat, and 386 pounds of fat. Similar data for other breeds are in tables 2 through 6. Data for Guernseys are in table 2; for Holsteins, in table 3; for Jerseys, in table 4; for Brown Swiss, in table 5; and for Milking Shorthorns, in table 6.

REDUCING RECORDS TO A TWICE-A-DAY MILKING BASIS

Records of cows milked three or four times daily are reduced to a twice-a-day milking basis for summarizing DHIA sires.

Through the years various investigators have made numerous studies to determine the effect of frequency of milking on total milk production. While the results of these studies are not in complete agreement, there is sufficient evidence to indicate that, on the average, at 2 years of age a cow will produce approximately 20 percent more milk if she is milked three times a day than if she is milked only twice a day; at 3 years of age she will produce approximately 17 percent more; and at 4 years of age and over, she will produce approximately 15 percent more. Similarly, at 2 years of age a cow will produce approximately 35 percent more milk if she is milked four times a day than if she is milked only twice a day; at 3 years of age, she will produce approximately 30 percent more; and at 4 years of age and over, she will produce approximately 26 percent more. These percentages are used as a basis for adjusting production records of cows milked more than twice a day to a twice-a-day milking basis.

The production records of cows milked more than twice a day are adjusted to a twice-a-day milking basis after the actual records have been converted to a mature-equivalent basis. All records made by cows milked more than twice a day during all or part of the 305-day lactation period are reduced to a twice-a-day milking basis by multiplying the mature-equivalent record by the appropriate factor in table 7, page 8.

TABLE 1.--Average yields of Official DHI lactations of AYRSHIRE cows, by State, for calving year 1969 on a 2x, 305-day, M.E. basis

State	Records	Milk	Fat	Fat	State	Records	Milk	Fat	Fat	State	Records	Milk	Fat	Fat
	No.	Lb.	%	Lb.		No.	Lb.	%	Lb.		No.	Lb.	%	Lb.
Ala----	124	10,777	3.58	386	La-----	154	9,400	3.56	334	Ohio---	1,405	11,303	3.89	440
Alaska----	-----	-----	-----	---	Maine---	290	10,982	4.02	442	Okla---	388	11,267	3.87	436
Ariz---	85	11,827	4.02	473	Md-----	541	11,297	4.00	452	Oreg---	328	11,632	3.84	447
Ark----	4	9,155	4.09	367	Mass---	930	11,723	3.95	463	Pa-----	2,188	11,054	3.98	440
Calif---	273	13,598	3.96	538	Mich---	169	11,148	3.84	428	R. I---	265	11,811	3.79	448
Colo---	105	10,764	3.84	412	Minn---	725	10,410	3.84	400	S. C---	39	11,186	3.96	443
Conn---	646	12,161	3.92	477	Miss---	671	10,183	3.67	374	S. Dak-	130	10,509	3.87	406
Del----	195	10,657	4.14	441	Mo-----	23	9,630	3.78	363	Tenn---	198	10,579	3.95	418
Fla----	429	9,211	3.68	339	Mont---	69	12,730	3.80	483	Tex----	76	11,402	3.51	401
Ga-----	245	10,798	3.88	419	Nebr---	207	9,829	3.96	389	Utah---	26	10,942	3.78	413
Hawaii----	-----	-----	-----	---	Nev-----	-----	-----	-----	---	Vt-----	1,739	11,935	3.89	464
Idaho---	56	11,649	3.81	444	N. H---	799	12,266	3.91	480	Va-----	554	11,604	3.90	453
Ill----	700	11,172	3.83	428	N. J---	24	11,687	3.96	463	Wash---	557	11,610	3.92	455
Ind----	252	11,931	3.95	472	N. Mex-	10	11,592	3.80	441	W. Va--	228	10,667	3.90	416
Iowa---	1,247	11,062	3.78	419	N. Y---	4,483	12,097	3.90	472	Wis----	571	10,946	3.82	418
Kans---	1,054	10,881	3.91	426	N. C---	260	11,908	3.87	461	Wyo----	-----	-----	-----	---
Ky-----	92	11,410	3.90	446	N. Dak-	1	14,310	3.96	566	U.S----	23,555	11,415	3.89	444

TABLE 2.--Average yields of Official DHI lactations of GUERNSEY cows, by State, for calving year 1969 on a 2x, 305-day, M.E. basis

State	Records	Milk	Fat	Fat	State	Records	Milk	Fat	Fat	State	Records	Milk	Fat	Fat
	No.	Lb.	%	Lb.		No.	Lb.	%	Lb.		No.	Lb.	%	Lb.
Ala----	1,151	8,728	4.30	375	La-----	1,775	9,103	4.38	399	Ohio---	5,568	9,923	4.67	464
Alaska----	-----	-----	-----	---	Maine---	853	9,737	4.61	449	Okla---	654	9,769	4.43	433
Ariz---	870	12,733	4.18	533	Md-----	2,990	9,450	4.78	451	Oreg---	2,662	10,574	4.61	487
Ark----	284	8,992	4.33	389	Mass---	1,238	10,351	4.67	483	Pa-----	9,961	9,859	4.67	460
Calif---	4,016	11,046	4.54	501	Mich---	2,764	10,662	4.77	509	R. I---	98	8,505	4.44	378
Colo---	578	9,667	4.58	443	Minn---	4,954	9,723	4.68	455	S. C---	4,238	10,063	4.54	457
Conn---	1,943	10,457	4.59	480	Miss---	2,082	9,363	4.42	414	S. Dak-	51	10,082	4.54	458
Del----	397	8,405	4.65	392	Mo-----	2,234	9,716	4.60	447	Tenn---	1,735	9,629	4.59	442
Fla----	3,639	8,633	4.27	369	Mont---	41	12,209	5.06	617	Tex----	529	8,705	4.35	379
Ga-----	1,775	10,049	4.57	459	Nebr---	906	8,947	4.79	429	Utah---	180	9,813	4.38	430
Hawaii----	2	12,900	3.06	395	Nev-----	1	8,630	4.63	400	Vt-----	698	9,963	4.68	466
Idaho---	1,492	10,192	4.55	464	N. H---	448	9,178	4.47	410	Va-----	4,109	9,727	4.72	459
Ill----	3,003	9,517	4.68	446	N. J---	1,645	9,803	4.81	472	Wash---	3,487	11,013	4.67	515
Ind----	4,629	10,324	4.74	489	N. Mex-	1,782	11,286	4.16	470	W. Va--	608	8,958	4.63	415
Iowa---	3,173	9,361	4.71	441	N. Y---	5,570	10,208	4.66	476	Wis----	9,020	9,933	4.67	464
Kans---	1,190	9,355	4.74	443	N. C---	2,119	9,962	4.62	461	Wyo----	21	11,401	4.53	517
Ky-----	851	9,110	4.58	418	N. Dak-	62	11,435	4.76	544	U.S----	104,076	9,939	4.62	459

TABLE 3.--Average yields of Official DHI lactations of HOLSTEIN cows, by State, for calving year 1969 on a 2x, 305-day, M.E. basis

State	Records	Milk	Fat	Fat	State	Records	Milk	Fat	Fat	State	Records	Milk	Fat	Fat
	No.	Lb.	%	Lb.		No.	Lb.	%	Lb.		No.	Lb.	%	Lb.
Ala----	20,354	12,561	3.58	449	La-----	5,073	13,098	3.38	443	Ohio---	61,434	13,905	3.64	506
Alaska----	117	14,216	3.48	495	Maine---	15,408	14,641	3.69	541	Okla---	16,236	13,464	3.47	467
Ariz---	7,542	15,203	3.39	516	Md-----	30,350	13,938	3.71	517	Oreg---	14,141	14,948	3.67	549
Ark----	3,955	12,975	3.34	433	Mass---	15,180	14,801	3.73	553	Pa-----	109,741	14,579	3.70	540
Calif---	78,823	16,365	3.57	584	Mich---	60,637	13,974	3.61	504	R. I---	1,154	14,347	3.64	523
Colo---	11,534	14,444	3.53	511	Minn---	101,189	14,080	3.60	508	S. C---	16,049	13,491	3.63	490
Conn---	19,018	15,261	3.60	550	Miss---	10,830	12,483	3.49	436	S. Dak-	5,421	13,871	3.54	491
Del----	3,723	13,751	3.69	507	Mo-----	22,571	13,187	3.55	468	Tenn---	19,891	13,367	3.60	481
Fla----	10,473	12,580	3.42	430	Mont---	1,641	14,722	3.55	522	Tex----	20,266	13,896	3.42	476
Ga-----	23,948	13,276	3.60	478	Nebr---	16,266	12,866	3.68	473	Utah---	15,054	14,371	3.51	505
Hawaii----	1,452	12,787	3.11	398	Nev-----	734	15,667	3.51	546	Vt-----	29,432	14,467	3.60	520
Idaho---	20,201	14,193	3.58	508	N. H---	8,251	14,559	3.72	541	Va-----	50,871	13,912	3.61	502
Ill----	40,705	13,798	3.69	509	N. J---	18,679	14,562	3.64	530	Wash---	36,100	15,419	3.59	553
Ind----	28,249	13,846	3.67	508	N. Mex-	5,125	15,188	3.39	515	W. Va--	8,457	13,518	3.64	492
Iowa---	46,748	13,129	3.62	475	N. Y---	169,781	15,014	3.55	533	Wis----	107,586	14,336	3.67	526
Kans---	32,109	13,649	3.58	489	N. C---	41,208	14,229	3.60	512	Wyo----	153	13,722	3.49	478
Ky-----	17,329	13,273	3.56	473	N. Dak-	4,760	13,134	3.61	474	U.S----	1,405,949	14,277	3.61	515

TABLE 4.--Average yields of Official DHI lactations of JERSEY cows, by State, for calving year 1969 on a 2x, 305-day, M.E. basis

State	Records	Milk	Fat	Fat	State	Records	Milk	Fat	Fat	State	Records	Milk	Fat	Fat
	No.	Lb.	%	Lb.		No.	Lb.	%	Lb.		No.	Lb.	%	Lb.
Ala----	4,554	8,511	4.71	402	La-----	1,710	8,307	4.63	385	Ohio---	6,118	8,791	5.12	450
Alaska--	1	16,040	3.97	637	Maine---	1,724	9,894	4.98	493	Okla---	742	8,589	4.98	428
Ariz----	747	9,654	4.73	456	Md-----	635	8,412	5.27	444	Oreg---	4,854	9,864	5.07	500
Ark----	514	8,483	4.75	403	Mass---	1,359	9,700	5.19	503	Pa-----	3,688	9,369	5.04	472
Calif---	8,021	10,311	4.99	514	Mich---	2,441	8,487	5.25	445	R. I----	38	11,013	5.28	583
Colo----	718	8,561	5.07	434	Minn---	2,513	8,806	5.02	442	S. C----	3,716	9,744	5.05	493
Conn---	442	10,208	5.03	514	Miss---	4,468	8,473	4.77	404	S. Dak--	88	7,659	5.19	397
Del----	121	8,219	5.06	416	Mo-----	2,125	8,861	5.01	444	Tenn---	5,017	9,012	4.87	439
Fla----	2,774	8,125	4.60	374	Mont---	49	9,276	5.30	492	Tex----	3,777	8,836	4.68	413
Ga-----	2,797	8,711	4.97	433	Nebr---	202	8,731	5.00	437	Utah---	1,344	8,690	4.89	425
Hawaii--	15	8,083	4.12	333	Nev----	687	10,650	5.10	544	Vt-----	6,052	9,369	5.08	476
Idaho---	1,901	8,842	5.13	454	N. H----	1,248	9,681	5.11	495	Va-----	1,511	9,074	5.13	465
Ill-----	1,398	8,767	5.09	446	N. J----	724	10,733	5.05	542	Wash---	4,038	10,097	5.10	515
Ind-----	1,676	8,467	5.09	431	N. Mex--	188	9,579	4.82	462	W. Va--	541	9,065	5.12	464
Iowa---	2,255	8,325	5.14	428	N. Y----	4,539	9,386	5.04	474	Wis----	2,244	9,195	5.07	467
Kans---	915	8,715	5.09	444	N. C----	3,489	8,623	4.99	430	Wyo----	-----	-----	-----	---
Ky-----	2,306	8,691	4.95	430	N. Dak--	8	8,515	4.32	366	U.S----	103,032	9,142	4.99	456

TABLE 5.--Average yields of Official DHI lactations of BROWN SWISS cows, by State, for calving year 1969 on a 2x, 305-day, M.E. basis

State	Records	Milk	Fat	Fat	State	Records	Milk	Fat	Fat	State	Records	Milk	Fat	Fat
	No.	Lb.	%	Lb.		No.	Lb.	%	Lb.		No.	Lb.	%	Lb.
Ala----	775	11,681	3.89	454	La-----	99	12,092	3.71	449	Ohio---	1,922	12,614	4.18	527
Alaska--	13	13,078	3.82	500	Maine---	56	12,826	4.13	529	Okla---	251	13,230	3.91	518
Ariz----	265	15,561	4.01	625	Md-----	507	12,081	4.11	497	Oreg---	658	14,009	4.03	564
Ark----	26	12,705	3.73	477	Mass---	125	13,372	4.14	554	Pa-----	890	12,654	4.09	518
Calif---	560	13,874	3.94	547	Mich---	501	11,861	4.00	474	R. I----	-----	-----	-----	---
Colo----	452	13,001	4.07	529	Minn---	1,539	12,309	3.98	490	S. C----	469	12,591	3.95	497
Conn---	382	13,594	4.06	551	Miss---	41	11,374	3.96	451	S. Dak--	267	11,700	3.99	466
Del----	42	11,848	3.80	453	Mo-----	555	11,236	4.00	449	Tenn---	756	11,883	3.95	470
Fla----	709	11,585	3.79	439	Mont---	111	13,530	4.14	561	Tex----	425	12,873	3.85	495
Ga-----	597	12,555	3.86	484	Nebr---	573	11,595	4.14	480	Utah---	66	13,832	3.78	523
Hawaii--	3	15,887	3.20	509	Nev----	2	15,580	3.28	512	Vt-----	314	14,095	3.87	546
Idaho---	171	12,211	3.97	485	N. H----	108	12,323	3.99	491	Va-----	519	12,303	4.00	492
Ill-----	1,785	11,700	4.11	480	N. J----	426	13,286	4.13	548	Wash---	424	14,630	4.04	591
Ind-----	949	12,806	4.06	520	N. Mex--	6	10,890	4.12	448	W. Va--	24	10,853	3.94	428
Iowa---	2,972	11,755	4.01	472	N. Y----	1,777	13,140	4.02	529	Wis----	2,382	12,291	4.01	493
Kans---	745	11,693	4.01	469	N. C----	446	12,093	3.97	480	Wyo----	-----	-----	-----	---
Ky-----	318	11,338	3.95	448	N. Dak--	148	12,002	4.13	497	U.S----	27,151	12,419	4.02	499

TABLE 6.--Average yields of Official DHI lactations of MILKING SHORTHORN cows, by State, for calving year 1969 on a 2x, 305-day, M.E. basis

State	Records	Milk	Fat	Fat	State	Records	Milk	Fat	Fat	State	Records	Milk	Fat	Fat
	No.	Lb.	%	Lb.		No.	Lb.	%	Lb.		No.	Lb.	%	Lb.
Ala----	2	7,700	3.58	276	La-----	2	13,180	3.92	517	Ohio---	142	8,895	3.83	341
Alaska--	---	-----	-----	---	Maine---	64	8,853	3.84	340	Okla---	238	10,158	3.53	359
Ariz----	39	12,041	3.52	440	Md-----	2	10,330	3.69	370	Oreg---	71	11,244	3.97	448
Ark----	105	11,120	3.53	381	Mass---	48	9,842	3.85	380	Pa-----	77	9,836	3.73	367
Calif---	201	10,837	3.91	425	Mich---	43	9,810	3.55	348	R. I----	---	-----	-----	---
Colo----	16	15,763	3.56	562	Minn---	407	10,269	3.71	381	S. C----	6	12,447	4.52	563
Conn---	5	11,612	3.96	461	Miss---	3	8,723	3.80	332	S. Dak--	26	8,895	3.88	344
Del----	---	-----	-----	---	Mo-----	170	10,540	3.55	374	Tenn---	2	9,150	4.80	439
Fla----	7	10,413	3.54	369	Mont---	7	9,764	3.89	380	Tex----	5	10,096	3.50	354
Ga-----	12	10,894	3.83	418	Nebr---	126	8,605	3.77	324	Utah---	7	12,994	3.54	460
Hawaii--	1	11,110	2.73	303	Nev----	---	-----	-----	---	Vt-----	53	10,342	3.60	239
Idaho---	36	12,537	3.79	474	N. H----	4	9,540	3.90	372	Va-----	7	9,200	3.70	340
Ill-----	85	11,572	3.88	448	N. J----	---	-----	-----	---	Wash---	79	10,367	3.81	398
Ind-----	64	11,997	3.60	432	N. Mex--	2	8,055	4.47	360	W. Va--	---	-----	-----	---
Iowa---	452	9,651	3.68	355	N. Y----	58	10,171	3.52	356	Wis----	282	9,990	3.71	371
Kans---	28	9,199	3.65	336	N. C----	7	9,824	3.86	379	Wyo----	---	-----	-----	---
Ky-----	2	7,735	3.92	304	N. Dak--	38	11,304	3.62	409	U.S----	3,031	10,210	3.70	378

For example, suppose a Jersey cow freshened at 4 years 6 months of age and that she was milked three times a day for 80 days of her 305-day lactation period. Her record is standardized as follows: (1) Her actual production record is multiplied by the appropriate factor (February 1967 Dairy Herd Improvement Letter, ARS 44-188) to convert it to a mature-equivalent basis. (2) Her mature-equivalent record is reduced to a twice-a-day milking basis by multiplying by the factor 0.96 (table 7, page 8, column headed Factor for three-times-a-day milking, 4 years of age and over, and the row for 76 to 85 days milked). The result is her standardized record, that is, her 305-day age-corrected record on a twice-a-day milking basis.

Suppose a Brown Swiss cow freshened at 3 years 6 months of age and was milked four times a day for 50 days of her lactation period. Her record is standardized as follows: (1) Her record is converted to a mature-equivalent basis by using the appropriate age-conversion factor (ARS 44-188). (2) Her mature-equivalent record is reduced to a twice-a-day milking basis by multiplying by the factor 0.95 (table 7, page 8, column headed Factor for four-times-a-day milking, 3 to 4 years of age, and the row for 46 to 55 days milked). The result is her standardized record.

To standardize the record of a cow that was milked two, three, and four times a day for different periods while she was making her record, the procedure is somewhat more involved.

The record is first converted to a mature-equivalent basis by using the appropriate age-conversion factor in ARS 44-188.

Then her mature-equivalent record is reduced to a twice-a-day milking basis as follows: The number of days she was milked three times a day is converted to a four-times-a-day basis by multiplying by the factor 0.6. (It is assumed that she would have produced as much milk on four milkings a day in 0.6 as many days as she did on three milkings a day.) The figure obtained is added to the number of days she was actually milked four times a day to obtain a four-times-a-day

milking figure. Then her mature-equivalent record is reduced to a twice-a-day milking basis in the usual way.

For example, suppose a Holstein cow freshened at 4 years 5 months of age and was milked four times a day for 35 days, three times a day for 100 days, and twice a day for the balance of the 305-day lactation period. Her record is first converted to a mature-equivalent basis by using the appropriate age-conversion factor (ARS 44-188). Then her mature-equivalent record is reduced to a twice-a-day milking basis as follows: (1) The number of days she was milked three times a day (100) is multiplied by 0.6 to convert it to a four-times-a-day, or 60 days. This figure (60) is added to the number of days she was actually milked four times a day to obtain the total four-times-a-day figure (60 + 35), or 95 days. Her mature-equivalent record is then reduced to a twice-a-day milking basis by multiplying by the factor 0.93 (table 7, column headed Factor for four-times-a-day milking, 4 years of age and over, and the row for 86 to 95 days milked). The result is her standardized record.

TABLE 7.--Factors for reducing 305-day, age-corrected records to a twice-a-day milking basis

Number of days milked	Factor for three-times-a-day milking			Factor for four-times-a-day milking		
	2 to 3 years of age	3 to 4 years of age	4 years of age and over	2 to 3 years of age	3 to 4 years of age	4 years of age and over
5 to 15	0.99	0.99	0.99	0.98	0.99	0.99
16 to 25	.98	.99	.99	.97	.98	.98
26 to 35	.98	.98	.98	.96	.97	.97
36 to 45	.97	.98	.98	.95	.96	.96
46 to 55	.97	.97	.97	.94	.95	.96
56 to 65	.96	.97	.97	.93	.94	.95
66 to 75	.95	.96	.96	.92	.93	.94
76 to 85	.95	.95	.96	.91	.92	.93
86 to 95	.94	.95	.96	.90	.91	.93
96 to 105	.94	.94	.95	.89	.91	.92
106 to 115	.93	.94	.95	.88	.90	.91
116 to 125	.92	.93	.94	.87	.89	.90
126 to 135	.92	.93	.94	.87	.88	.90
136 to 145	.91	.93	.93	.86	.88	.89
146 to 155	.91	.92	.93	.85	.87	.88
156 to 165	.90	.92	.93	.84	.86	.88
166 to 175	.90	.91	.92	.83	.85	.87
176 to 185	.89	.91	.92	.82	.85	.86
186 to 195	.89	.90	.91	.82	.84	.86
196 to 205	.88	.90	.91	.81	.83	.85
206 to 215	.88	.89	.90	.80	.83	.85
216 to 225	.87	.89	.90	.79	.82	.84
226 to 235	.87	.88	.90	.79	.81	.83
236 to 245	.86	.88	.89	.78	.81	.83
246 to 255	.86	.88	.89	.77	.80	.82
256 to 265	.85	.87	.88	.77	.79	.82
266 to 275	.85	.87	.88	.76	.79	.81
276 to 285	.84	.86	.88	.75	.78	.80
286 to 295	.84	.86	.87	.75	.78	.80
296 to 305	.83	.85	.87	.74	.77	.79

FORMIC ACID APPROVED AS ADDITIVE TO FORAGE AT ENSILING

by D. R. Waldo^{4/}

Food and Drug Administration approval for the use of formic acid on forage at ensiling was published in Federal Register, Vol. 37, No. 56, Wednesday, March 22, 1972.

"Formic acid may be safely used as a preservative in hay crop silage in an amount not to exceed 2.25 percent of the silage on a dry weight basis or 0.45 percent with direct-cut. The top foot of silage stored should not contain formic acid and silage should not be fed to livestock within 4 weeks of treatment."

These levels of addition are expressed as actual acid. Commercial 90 percent formic acid may be added at 0.5 percent of direct-cut forage (w/w) or 2.5 percent of forage dry matter.

Formic acid is currently available only through chemical wholesalers in the larger cities. Field application equipment is currently available only from Norway or England. Simple gravity flow addition at the blower may be used for filling tower silos.

Observe precautionary labels on formic acid. Formic acid is a caustic and volatile liquid. Persons using it should wear protective goggles and vinyl or rubber gloves to avoid eye injury or skin burns. Avoid breathing vapors. In case of contact, flush with water for at least 15 minutes.

- - - - -

^{4/} Nutrition Investigations, DCRB, ASR

ERRATUM: The title for table 7 of the September-October Dairy Herd Improvement Letter, ARS 44-236, should read: Variation among States in percentage of Official DHI lactation records with sire identification that were reported to USDA in 1968, 1969, and 1970.

SUBJECT INDEX--1971 DAIRY HERD IMPROVEMENT LETTERS, VOL. 47.

Artificial Breeding Report. June-July, ARS 44-233.

DHIA Participation Report. April, ARS 44-229.

Economic Index. January, ARS 44-223.

Herd Average Summaries, 1968 through 1970.
March, ARS 44-226.

Herd Average Summaries, 1971. August, ARS 44-235.

Lactation Averages by State, 1961 through 1968.
May, ARS 44-230.

Lactation Averages, National, 1954 through 1968.
February, ARS 44-225.

Lactation Records Received. September-October,
ARS 44-236.

Percent of Cows with Sire Identification.
September-October, ARS 44-236.

Record use for bull and cow evaluation.
September-October, ARS 44-236.

Records not used in sire summaries.
September-October, ARS 44-236.

Registered vs. grade yield comparison.
November-December, ARS 44-238.

Sire identification in Official DHI records.
September-October, ARS 44-236.

TITLE INDEX--1971 DAIRY HERD IMPROVEMENT LETTERS, VOL. 47.

Artificial Breeding Report, 1970. June-July, ARS 44-233.

DHIA Participation Report, January 1, 1971. April,
ARS 44-229.

(An) Economic Index for Determining the Relative Values
of milk and fat in Predicted Differences of Bulls and
Cow Index Values of Cows. January, ARS 44-223.

(USDA-DHIA) Herd Average Summaries 1967-68; 1968-69;
1969-70. March, ARS 44-226.

(USDA-DHIA) Herd Average Summaries, 1970-1971.
August, ARS 44-235.

Lactation Averages by Breed and Year for Official DHI
Cows Calving from 1954 through 1968. February,
ARS 44-225.

Lactation Records Received by USDA. September-October,
ARS 44-236.

Percent of Cows with Sire Identification.
September-October, ARS 44-236.

Records Reported but not Used in Genetic Evaluations.
September-October, ARS 44-236.

Sire Identification Important for Dairy Herd Management.
September-October, ARS 44-236.

Sire Identification in Official DHI Lactation Records
by State, 1968-1970. September-October, ARS 44-236.

State Lactation Averages by Breed and Year for Official
DHI Cows Calving from 1961 through 1968. May,
ARS 44-230.

Summary of Lactation Records Reported.
September-October, ARS 44-236.

Summary of the use of Official DHI Records for Bull and
Cow Evaluation. September-October, ARS 44-236.

Yields of Registered and Grade Cows. November-December,
ARS 44-238.

U. S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
BELTSVILLE, MARYLAND 20705

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, \$300

POSTAGE AND FEES PAID
U.S. DEPARTMENT OF
AGRICULTURE

